TRENDS IN EDUCATION

1

New Degree System
Children's Writing
Computer Personnel
Growth and Productivity
Educational Research

JANUARY 1968

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Foreword

Secretary of State for Education and Science

The word *trend* implies movement in a given direction towards a point not yet reached. The purpose of this journal is to reflect and publicise significant developments in the work of those who educate and those who help to create the conditions under which fruitful education can take place. This is particularly important at a time when education claims an increasing share of national expenditure and when its importance for our future prosperity is increasingly realised.

In an evolving situation views differ about what needs doing and ways of bringing about change. This is both inevitable and desirable, and it may sometimes be valuable to read opinions which challenge existing assumptions or criticise current practices. It has always been valuable for teachers and educational administrators to learn from each other, and they may also learn from other specialists—economists and architects for instance. We may profit, too, from accounts of what is being done in new directions in other countries. I believe it is important to have a journal which, besides drawing attention to educational developments as such, can act as a forum for new ideas and views and as another point of contact between the Department and those professionally engaged in education as teachers and administrators. I hope that these groups, and indeed everyone who has an interest in what is going on in education today, will find something to interest them in the pages of *Trends in Education*

Antony Crosland

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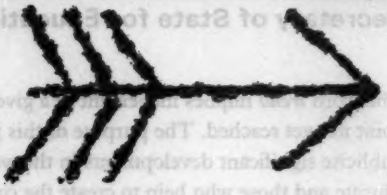

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The opinions expressed in Trends in Education *are the writers' own. They may not necessarily be in accordance with the views of the Department of Education and Science.*

Introduction

There have been periods in the development of English education when little has changed over a long time. We do not live in such a period. The education service today is in the grip of three considerable forces, each one of which could work a transformation. There is first the sheer growth in numbers to be educated, a consequence partly of a higher birth rate and partly of the keener appetite for what education may confer. There are secondly the pressures on the education service from the society of which it is an increasingly expensive member—pressures of a social, economic and technological kind. There are thirdly changes in the content and method of education, as knowledge accumulates at an accelerating pace and new ranges of skill and mechanical assistance are offered to the teaching profession.

Such a situation calls for new methods of communication, within the education service and between the service and its consumers. This publication is intended as a contribution to the satisfaction of that need. It will not replace, for example, the annual surveys or the monthly Reports already issued by the Department; nor will it remove the need for the educational pamphlets, largely written by H.M. Inspectorate, of which nearly 50 have been published since the war on most aspects of the work of the schools. Still less will it affect the system whereby the Department communicates with the local education authorities and others by way of circular and administrative memorandum. In addition to these, and to the work of the educational Press and the publications now emerging from the Schools Council, there seems to be scope for a publication which discusses trends of which it has particular knowledge and which deserve a wider currency.

For more than a century it has been a function of H.M. Inspectors to describe and reflect on current practice, new developments in the curriculum, and the quality of teaching. Descriptions and reflections of this kind will be published in *Trends in Education* They will not necessarily express the opinion or policy of the Department. Articles written inside the Department will give an account of problems and prospects as they appear to people working on these questions. Some will interpret the results of research and statistical analysis. The Department is giving financial support to about 100 research projects; if their results are to be understood and appropriately applied, there is need for a way of communicating them to busy people.

These are some examples of the source material for articles which should be appearing regularly. In these and other ways the Department intends to make known facts and assessments over a wide range of current developments. But it recognises both that more than one view may be taken of such developments and that special knowledge or experience may be found in any part of the education service. It is intended therefore to open the pages of *Trends in Education* to outside contributors. Publication of articles from such a source will not imply any endorsement whatever by the Department, beyond the recognition that here is a report or a comment on current practice and current thinking that is worthy of some attention.

H.M.I. Contributors

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The National Economic Plan says the share of the national product devoted to education will rise further between now and 1970. This article discusses the reasons and some of the consequences.

Growth and Productivity

One way to start an argument among educationists is to mention the productivity of teachers or to refer to schools and colleges as plant. These intrusions from the nomenclature of economics have a harshness which grates on the ear of the purist. In the realm of the mind and the spirit, which is the proper hunting-ground of those who teach, such sordid reminders of rude mechanics and still ruder measurements may seem to have no place.

It is true that the Socratic circle required no buildings or equipment. But even in Athens education cost some money (the children of the rich, Plato observed in the *Protagoras*, began their education soonest and left off latest). But provision was left to private enterprise. Today the state accepts responsibility, at all stages from nursery school to university, and this has some formidable implications for the economic life of the country. The education service is in open competition with other professions for highly skilled educated manpower. The salaries of teachers are paid by householders and taxpayers. Schools and colleges are part of the country's scarce investment resources. These are earthy considerations to put beside the cultivation of excellence which is every school teacher's dream. But every school teacher knows the frustration of books and buildings less adequate than he would like them. At a hundred points of his daily experience he is reminded that the economics of education is not something dreamed up by academics in search of a new discipline.

The reality of the economics of education is known also to administrators, whether in the employ of local or central government. They spend a good deal of their time stretching limited resources to join ends which seem constantly to be moving further apart. It is from their point of view that this article is mainly written. It begins with the proposition that education has been and still is one of the fastest growing parts of the public sector. It sets out to identify the factors that make for further growth and to establish who controls them. It asks what further growth may be possible and what may be its implications.

At any time and in any country six factors largely determine the growth in educational provision. An economist might divide them into three demand factors and three supply factors, and if the arrangement has mnemonic virtue why should he not have his way? The demand factors are:

(i) the growth and shifts of the population,
(ii) the period of compulsory schooling, and
(iii) the demand for voluntary education, whether at school or after school in institutions of further and higher education.

The supply factors are:

(i) capital provision, which includes both new buildings and replacements,

(ii) staffing provision, which includes both pupil-teacher ratios and the ratio of teaching staff to non-teaching staff, and

(iii) current provision of books, equipment and materials.

There is a seventh factor, difficult to define and almost impossible to measure. It is concerned not with quantity but with quality, not with the numbers of pupils and students but with the standards of provision which each on average enjoys. Particular standards are sometimes laid down in terms of desirable minima—for school buildings, for example, or for teacher/pupil ratios— and the Department takes the leading part in setting such standards. But the standard of education itself is in the last resort something different from a set of minimum standards: it includes, for example, the quality of the teaching, which is affected by many things. This aspect of the subject is not developed in this article, which is limited to the measurable aspects of the economics of education.

Among the three demand factors one only—the period of compulsory schooling—is subject to control by the central authority. The growth of the population and its appetite for education are the outcome of a very large number of individual responses to a complex of influences. Predictions are possible for both, but can be—and have been—seriously wrong. Among the supply factors the central authority controls building programmes (subject to local authority proposals on the one hand and pressure on national investment resources on the other). The provision of staff turns *inter alia* on the availability of training plant, the remuneration and status of the teaching profession, the recruitment policies of individual employing authorities, and professional views on what is and what is not permissible practice. The final factor, spending on current supplies, is within the control of each local education authority, and sometimes (within the limits of a capitation grant for the local authority) of each school.

For education, as for other goods and service, the level at which a balance is struck is determined in part by the methods adopted to finance it and in particular by the financial controls. The financing of education in this country is partly voluntary, partly local, and partly national. The controls are exercised by a variegated host, ranging from the managers of the village school to the Public Accounts Committee of the House of Commons. The responsibility for what ultimately emerges as the level of educational provision is therefore widely distributed, and in some respects at least is likely to remain so.

Birth rate and growth rate

In discussing the balance of supply and demand in education, the first thing to notice is that changes in the population of school age anticipate changes in the population of working age by a decade or two. At a time when the birth rate is rising (as it has done continuously since 1955) there is a demand for more resources for education, including teachers and buildings, before the working population has risen sufficiently to provide for them. In England and Wales the maintained school population has gone up since the war from five to seven million; and in addition more education is now provided per head. The share

of education in the national product has in consequence risen from 3 per cent to 5 per cent.

This kind of increase seems likely to continue. Between 1963 and 1973 the school population is estimated to rise by 23 per cent, apart from the effect of raising the statutory leaving age in 1970. During this period the Ministry of Labour estimates a rise in the working population of 3 per cent. From the early Seventies the more numerous babies of the late Fifties will begin to join the working population; but their labour will need to provide, among other things, for the education of the still more numerous babies of the Sixties. Given the babies already born up to 1965, to maintain existing standards in education will require both an increase in national productivity from now to 1980 and an increase in education's share of the national product.

It is at this point that the economist begins to wonder whether the resources at the disposal of the education service—which means basically its buildings, its teachers, and their equipment—might be used to greater effect. He wonders still more when he considers the second and third 'demand factors', observing first the decision to raise the school-leaving age to sixteen in 1970, and secondly the trend to voluntary staying-on at school beyond sixteen, together with the expansion of further education at all levels and the growth of higher education in institutions of all kinds. The effect of the higher statutory school age will be to raise the school population by about 350,000 in one year (1971 to 1972) on top of the average annual increase of 163,000 between 1963 and 1973. The published day release target is for another 250,000 students by 1970 and the further education system is likely to be further swollen by the educational consequences of the Industrial Training Act. In all institutions of higher education there is to be an increase of 170,000 places between 1962/3 and 1973/4. It is estimated that by 1966/7 about 250,000 students in higher education will be receiving awards at a total cost to the nation of £100 million.

The economist, pursuing his relentless way, will further observe that those staying on at school and those continuing in full-time courses of further and higher education will be a loss to the productive power of the economy at the time. This will be offset at least in part by their enhanced productive power later on, but it is a further example of the tendency for education to make additional claims on resources before it adds to them.

Buildings, Teachers, Equipment

From the demand side of his equation the economist turns to the supply factors: what is the prospect for more buildings, more teachers, and more equipment?

The money value of all educational building has doubled in less than ten years. The need for new building to match the growth (and the mobility) of the population has however limited resources for replacement of old buildings ever since the war; and this will no doubt continue for some years. The schools survey of 1962 produced a figure of £1,368 million to bring all existing schools up to standard 'on the Utopian hypothesis that it could somehow be done overnight'. The present school-building programme for major and minor works is at the rate of £100 million a year, and well over half is pre-empted for basic needs. Building programmes for universities, including the upgraded colleges of advanced technology, up to 1969 have allowed for

some making good of obsolescence as well as for some further development of new places; but there will be need for a steep climb in later years.*

Educational building projects other than schools were subject to the six months postponement announced for the public sector in July. The Government's longer term proposals for educational building were announced in the autumn of 1965 as part of its capital investment proposals set out in *The National Plan*. Meanwhile inquiries have been on foot in various parts of the education service into the possibility of a more intensive use of buildings. Throughout 1965 a committee of the National Advisory Council on Education for Industry and Commerce was inquiring into the most effective use of technical college resources. In July the Secretary of State asked colleges of education to consider an increase of 20 per cent in the use of their buildings in addition to what has already been accomplished in this way in recent years. In August the universities were asked to make more intensive use of all existing accommodation.

The arithmetic of teacher supply was published in the ninth report of the National Advisory Council on Teacher Training and Supply and need not be repeated here—except to point out, as the report did, that to build up and sustain the teaching force recommended would require about half the total annual output of the higher education system. It was planned to have some 122,000 places by 1973/4 in the colleges of education; and it would be necessary in addition to attract into teaching at least the present proportion of university graduates. The demand for graduates outside teaching is also growing, and it is by no means a foregone conclusion that the teaching profession will attract all the recruits which ideally it would like to have.

The distribution of full-time teachers is governed by the quota system, which reflects the numbers expected to be available; but there is evidence that local authorities have varied a good deal in the vigour with which they recruit, and the skill with which they employ, part-time teachers. In Circular 6/65 the laggards were advised how to improve their performance.

Finally there is equipment. In January 1965 there were 9,000 schools and colleges with television sets, compared with 5,000 two years earlier. During 1965 eleven of the colleges of education were experimenting with closed-circuit television for training teachers; and more in-service training will be needed to help teachers to become producers as well as consumers of programmes. Several research projects are in hand on aspects of programmed learning; as the results begin to feed back into the schools the demand for equipment may grow, though it is by no means certain that teaching machines are essential for these techniques.

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*Building programmes are subject to a control by the central Government which is not applied to current expenditure. School building is controlled in total by decisions as to which schools may be provided, enlarged or substantially improved, and in detail by the prescription of minimum conditions which a school must satisfy and a maximum cost limit. Programmes for technical colleges and colleges of education are similarly controlled. For universities the system is different. Overall programmes are determined by the Government in the light of the same factors that govern total school-building allocations; but it falls to the University Grants Committee to decide how the funds should be distributed and what projects should be approved, and to give guidance on methods of planning or building.

On the provision of equipment local authorities have complete financial discretion; and their practice varies enormously, as figures published by the Institute of Municipal Treasurers and Accountants and the Society of County Treasurers have shown.

Another field for change that is within the determination of local authorities, sometimes in consultation with teachers, is the employment of non-teaching staff. This is a wide term, including such people as caretakers and secretaries with no part in the teaching process, librarians and laboratory assistants who give professional aid to teachers, and helpers who minister to the children without actually teaching. An enquiry was being made in 1965 into the last of these categories by the local authority and teaching organisations. The support of non-teaching staff, like the support of technical aids, can contribute to the effectiveness of the teacher in the role for which he has been trained.

Conclusions

With a stable population, a reasonable balance of supply and demand in education, and a steady growth rate for the national economy, the problem of educational growth would be comparatively simple. With an annual increment in national output of say, 4 per cent, a 4 per cent increase in resources for education might appear to be a reasonable norm. But this is not the model we have to work with. If the school population were growing no faster than the national income the problem would still be capable of a simple solution: namely, educational standards per head could be maintained by using education's share of the increment to provide for the rising numbers. But when fertility leaps ahead of productivity, education must either take a bigger share of a growing national income or allow its standards per head to fall. The situation is still further complicated by the fact that we do not start from a position of balanced supply and demand in education but with substantial arrears of buildings and teachers to be overtaken.

From this line of reasoning it would appear almost inevitable that education should increase its share of resources. Put another way this means that public expenditure on education will rise at a faster rate than the natural growth of the public revenues from which it is financed. Either other public expenditures must be cut to allow for this, or the total of public revenues must rise faster than the national income, in which case tax rates and/or local rates must rise. These fiscal consequences of educational development must be clearly faced by those who press for improvement at a time of rapidly rising numbers.

Education draws off a heavy dividend from the higher educational system in the form of the large proportion of students who themselves take up teaching. This resource is not unlimited, the expansion of the education service itself being the main limiting factor; and other needs for the services of the highly educated are growing. To fail to use these scarce resources—in schools, colleges and universities—to full effect, would be conspicuously wasteful and would undermine the widespread hopes for further educational advance.

A little-publicised recommendation of the Robbins Committee may prove to be one of the most momentous in the history of British higher education.

The New Degree System

The introduction of a new degree system alongside degrees of the universities cannot fail to have major consequences for the future of British higher education. Yet it went largely unnoticed in 1964, and the Council of National Academic Awards and its degrees are still unknown to most people. Except among those directly concerned with further education, this is true even of the educational world.

Not that it is surprising. C.N.A.A. degrees have only just begun to be awarded—to former Diploma in Technology students who became eligible for C.N.A.A. degrees and completed their courses in the summer of 1965. It will be three or four years before the first students graduate from courses initiated under the new Council. But it may not be long before the C.N.A.A. is awarding more degrees than any British university with the possible exception of London, and C.N.A.A. graduates will be numbered in tens of thousands. The Secretary of State for Education and Science, Mr Anthony Crosland, told Parliament on March 25th 1965, that he expected that there would be at least 50,000 full-time and sandwich advanced students in leading technical and other colleges in England and Wales by 1971. A high proportion will be studying for degrees of the C.N.A.A. These figures do not take into account part-time students and students from Scottish colleges.

It would, however, be a poor tribute to the achievements of the C.N.A.A. if it were to be chiefly noteworthy for the scale on which it issued degree certificates or the historically interesting fact that, always excepting the Archbishop of Canterbury (and the diligent researcher might be able to discover other precedents), it was the first body other than a university to be empowered to award degrees. The measure of its success will be the contribution which it makes to the distinctive development of higher education outside the universities.

The circumstances which led to the establishment of the C.N.A.A. existed before the appointment of the Robbins Committee. They were largely created by the policy initiated in the White Paper on Technical Education of 1956 which, in addition to the establishment of the Colleges of Advanced Technology, encouraged the parallel development of full-time and part-time advanced work at regional and other leading technical colleges. In reviewing the future of higher education the Robbins Committee had, therefore, not only to consider the place of the Colleges of Advanced Technology. They had to decide what provision should be made for the needs—represented by 28,000 full-time and sandwich advanced students and over 100,000 part-time ones—which were being met by other leading colleges. Many of the students were already working for the Diploma of Technology which had been instituted in 1956 for students in sandwich courses at honours degree

level. Under the far-sighted administration of the National Council for Technological Awards the Dip.Tech. had quickly gained a high reputation as an award of honours degree standing.

The Committee came to the conclusion that to meet these needs higher education should continue to be developed within the further education system alongside the universities and colleges of education. This led to the question of the academic awards for which the students should be prepared, and, enunciating the principle that there should be equal awards for equal performance, the Committee decided that there should be opportunities for obtaining degrees corresponding to those in the universities. Consistently with their general views on academic autonomy, they went on to recommend that while London external degrees should continue to be available a Council for National Academic Awards should be set up to administer a new degree system for non-university institutions. On the Council teachers from the colleges running the courses should be partners with teachers from the universities, and there should also be strong industrial representation. It should be modelled on the National Council for Technological Awards to whose work the Committee paid warm tribute.

This proposal was immediately accepted by the Government, and was quickly carried into effect with the support of the universities. The Council for National Academic Awards held its first informal meeting in the summer of 1964 and received its Royal Charter in September of the same year, less than twelve months after the publication of the Robbins report. Sir Harold Roxbee Cox (now Lord Kings Norton), the Chairman of the N.C.T.A., was appointed Chairman of the Council, and its members include several other leading members of the N.C.T.A. and two members of the Robbins Committee, Dame Kitty Anderson and Dr Helen Gardner.

The Robbins Committee thought that the future of some of the more successful further education institutions might ultimately lie within the university system, but they also urged that the colleges should pioneer and experiment on distinctive lines in accordance with their own traditions. They drew special attention to the needs of part-time students (whose numbers, they thought, might rise to 200,000 by 1973/74). They instanced business studies and the practical use of languages as fields particularly suited to distinctive developments.

The Robbins Committee saw the C.N.A.A. as one of the chief instruments through which these objectives might be achieved. The opportunities have been increased by the decision of the Government—announced by the Secretary of State in Parliament on March 25th 1965, and in his Woolwich Polytechnic speech on April 27th 1965—that the leading technical colleges and colleges of commerce shall be developed as centres of higher education in parallel with the universities and having as their goal excellence in their own sphere rather than translation to the university sector. Their role, Mr Crosland said, would differ from that of the universities but would be no less important, and they would be mainly concerned with three types of student —those who were qualified to go to universities but were better suited by a college course, those who needed courses somewhat less rigorous in academic standard than the normal university course, and part-time students in both categories. Sir Edward Boyle expressed similar views on behalf of the Opposition.

What is the nature of the degree awarding body with which the Robbins Committee and the Government have provided the colleges? The main points are these. The C.N.A.A. is autonomous. It is based on a partnership between the universities and the colleges, and the majority of its members are either university or college teachers, but it also includes members with industrial and local education authority experience and assessors from the Education Departments. The Charter sets no limits upon the subjects in which awards may be given but, under a provision which is of great importance for the standing of the awards, it must ensure that its degrees and other awards are comparable in standard to awards granted and conferred by universities. It can give awards after full-time, sandwich or part-time courses in institutions other than universities, and its scope extends to Scotland as well as to England and Wales. But, unlike the University of London in relation to external degrees, it is not an examining body. Its function is to consider and approve courses which are submitted to it. The responsibility for preparing the courses and conducting the examinations (subject to the appointment of acceptable external examiners) rests with the college, but the Council sets the standards which must be met in respect of course content, admission, qualifications of staff and facilities available for the course. In contrast with the arrangements for London external degrees the system is an internal one, but with external checks to guarantee national standards. The Council's first degrees are Bachelor of Arts and Bachelor of Science. The degrees of Master of Arts and Master of Science will be awarded after courses of post-graduate study approved by the Council. At present the Council awards its degree of Doctor of Philosophy only to students who carry out successfully a programme of original work in collaboration with a college and an industrial organisation. The Council is considering whether it will extend the award of its higher degrees in other directions.

A primary responsibility of the Council is to guarantee standards, and in the last resort its influence depends upon the power to withhold approval for courses which do not satisfy its requirements. But in the exercise of what may appear to be the limited function of choosing between the good and the less good it is uniquely well placed to promote improvements and to stimulate new and imaginative developments throughout the colleges which look to it for awards. How positive and creative this role may be was abundantly shown by the experience of the N.C.T.A. and the contribution which it made to the evolution of the Colleges of Advanced Technology to university status in less than ten years from their inception.

First, the Council provides a bridge between the college and the university. Many university teachers are already serving on the Council, its Committees and its subject boards, along in every case with teachers from the colleges. Others are called in for *ad hoc* assistance; it is the practice to include university teachers as well as college teachers and industrialists on the parties which visit colleges seeking approval of courses, and many more act as external examiners. The numbers will grow as the work develops. By these means colleges throughout the country are kept in first-hand touch with the latest developments in the universities and with up-to-date university thinking over the whole range of subjects covered by the Council. There is also a reciprocal flow of information and experience to the universities.

Secondly, the Council is the channel for the interchange of ideas and experience among the colleges themselves and between the colleges, the professional institutions and industry and commerce. As with the N.C.T.A. a positive and formative part in its work is being taken by the non-academic members of the Council and its committees and boards —all of high standing in their own fields—who are in touch with the requirements of employers and professional institutions and have first hand knowledge of the industrial and other occupations in which most C.N.A.A. graduates will make their careers.

The C.N.A.A. is a means and not an end, and to speculate about its future is to speculate about the future of the colleges and the ways in which they will rise to the opportunities of the post-Robbins era in British higher education.

When so much is still fluid, prophecy would be rash but it is possible to state the main problems which are likely to face the colleges and the Council and to consider some of the answers which may be found to them.

As far as technology and science is concerned the C.N.A.A. has decided to follow the broad lines laid down by the N.C.T.A. It will wholeheartedly encourage the use of sandwich courses wherever appropriate and intends to explore further the problems involved in the fuller interaction of academic study and practical training which is central to the sandwich principle. It has welcomed the decision of the Government to pay special grants to firms providing industrial training places for sandwich students in courses leading to its degrees.

What is necessarily more speculative is how the novel questions will be resolved. Four major issues can be identified.

First, there is the need to provide a range of courses in the arts, social studies and other subjects with which the colleges have not been as closely associated as with technology. A rapidly growing demand is expected. By general consent it will not be enough to reproduce university degree courses. This is not to say that there is no place for courses based on university models or that there is virtue in being different for its own sake. As the Robbins Committee envisaged, the colleges must, however, develop courses which evolve naturally out of their own special characteristics and traditions and are suited to students who require courses more directly related to their careers than has normally been the case with university courses. There is nothing novel in this concept. It is accepted by British universities in engineering, medicine, architecture and other subjects, it is well established in the former CATs and in the further education system generally, and it is a commonplace in the United States. What will be largely new in this country will be its application to disciplines such as English, modern languages, history and economics, in which the stress has been on scholarship rather than on practical relevance to careers other than teaching. It will be the duty of the C.N.A.A. to see that this is done consistently with the obligation to maintain standards comparable to university standards, but there is no prima facie reason why it should be more difficult than in the technologies.

This task can only be tackled successfully in the close co-operation with the professional bodies and employers which is central to the technical college tradition and to the structure and policies of the C.N.A.A. In business studies pioneer work had already been done before

the Council was formed. There has been discussion of a 'Dip.Comm.' to match the Dip.Tech. and prototypes of degree courses based on the sandwich principle and worked out in consultation with large employers existed in honours level courses at several colleges. The Crick Report on a higher award in Business Studies (1964) had recommended that there should be a national award for such courses and suggested the form they might take. In view of this preliminary work the C.N.A.A. has been able to give priority of consideration to sandwich courses in business studies, and a number have been approved, the first to receive approval outside the field of science and technology. There is obviously scope for similar courses—whether sandwich or full-time—devised in co-operation with the professional bodies and leading to careers in law, accountancy and other non-scientific professions, and with the development of teacher training in technical colleges the Council may be asked to approve courses in education. As already mentioned, the Robbins Committee itself suggested that modern languages with a more practical bias than in the universities would be a promising field for development. It may be more difficult to devise vocationally directed courses based on the more academic of the traditional arts disciplines, but English at least would lead naturally to careers in journalism, broadcasting and other mass media.

Librarianship and social work are other fields in which courses are being considered. Of 142 courses in arts and social studies known to the C.N.A.A. to be under consideration by colleges in April 1965, 35 were in business studies, 13 in economics, 16 in languages, 5 in administration, 4 in 'communication studies' and 3 in librarianship. Other subjects included accountancy, town planning, home economics and dietetics, and ergonomics.

Like the universities which are thinking on similar lines—the former CATs for example, and the new Business Schools—the C.N.A.A. and the colleges will be confronted with many as yet unanswered questions in working out the patterns which are best suited to the widely varying needs of different occupations. There will be the problems—differing in degree of difficulty from case to case—of deciding upon the academic content of courses intended to prepare students for careers in which the vocational skills are less specific than in the technologies. Sandwich courses will have to be adapted to conditions very different from those in which they have evolved, and new methods may have to be found of relating study and practical training. Account will have to be taken of occupations in which systematic training is unknown, the typical firm is very small, or a system of articles prevails.

What the C.N.A.A. can accomplish in this largely unexplored territory could have wider consequences as far reaching as the development of full-time and sandwich courses in the technologies and the gradual supersession of the 'hard way' route to professional qualifications through part-time day and evening study. A vigorous system of vocationally oriented degree courses in the arts and social studies would stimulate the spread of full-time education and training for the non-scientific professions, increase their attractiveness to sixth-formers and reduce the wastage inherent in spare time study as a preparation for professional examinations.

A second group of problems arises from the need to make better provision for the large number of students who are not well suited to

honours degree courses. This need was stressed by the Robbins Committee and the responsibility for meeting it lies with the universities as well as the colleges. But it will concern the colleges more than the universities because they will be covering the whole range of ability within the higher education spectrum and not a highly selected group of those who are best qualified academically.

From the start the C.N.A.A. made it clear that it was ready to accept its share of this responsibility, and colleges were invited to submit proposals for 'ordinary' degree courses specially designed for students who are not suited to honours degree work. The main difficulty is less likely however, to lie in the planning of courses than in persuading students that they will do better to aim at ordinary than honours degrees. 'Pass' and 'ordinary' degrees have suffered a serious loss of esteem as a result of intensified competition for honours degree places. It will be an uphill but essential task to overcome the psychological resistances and to restore sufficient acceptability to the 'ordinary' degree to ensure that students are not diverted into honours courses for irrelevant reasons. This may be partly a matter of nomenclature: there are opportunities for inventiveness here.

Thirdly, there will be new and difficult problems in connection with part-time students. At present they fall into three main groups: those working for courses such as the Higher National Certificate which have been specially devised for part-time study, those who are taking London external degrees with curricula and examinations identical to those for full-time students, and those who are working for the examinations of professional bodies often by private or correspondence study. The part-time degree students at colleges in England and Wales number some 2,500 at present, and there are about 50,000 H.N.C. students.

Colleges have so far shown little interest in submitting part-time degree courses for C.N.A.A. approval. This is understandable. The new full-time structure must be established first. But the C.N.A.A. has invited colleges to inform it of any proposals for part-time degree courses they have in mind, particularly for mature students, and the scope for adventurous experiment is great. Despite the trend away from part-time to full-time study for the younger students, all the evidence suggests that the expansion of full-time higher education will feed the appetite for high level qualifications and will stimulate the demand for part-time courses from those who have missed the opportunity of obtaining them or wish to improve or add to the qualifications they already have. This is also the group to which traditional methods of part-time vocational education are least well adapted.

Fundamental rethinking will be necessary. It will not be enough to make minor adaptations in full-time (and still more sandwich) courses. Courses for part-time students will have to be planned to take account of their entirely different circumstances—the relatively greater maturity of many, the rigours of part-time and especially evening study combined with employment, difficulties in attending classes because of business commitments, the amount of time taken in travelling to and from classes, and other factors which do not apply to full-time students. There are the special needs of married women with children, and of people in jobs which frequently take them away from home.

This is the field above all in which there will be scope for the use of unconventional methods of teaching and course organisation. Programmed learning, television and radio, postal tuition, tutorial methods,

short residential courses, may all play their part, and it should be possible to learn much from the various experiments which are already being made—by some of the colleges and the Advisory Centre for Education, for example—in the development of new teaching techniques for the part-time and especially the mature student.

In an article in the *Times Educational Supplement* on the 29th January 1965, Mr George Taylor, then Chief Education Officer for Leeds, stressed the advantages which the mature student will often enjoy in greater dedication, emotional stability and experience. These are the foundations on which it will be necessary to build but allowance will have to be made for the disadvantages from which he also suffers. Mr Taylor instanced deterioration in memory and domestic and other circumstances which may prevent a course being pursued in consecutive years or in the same institution throughout. He suggested that the remedy for the first might be examination by assessment at the end of each year, and for the second provision for inter-changeability of courses and places of study on the German university pattern. The object must be to adapt the courses to students with needs and aptitudes which differ fundamentally from those of their younger contemporaries. Without prejudice to academic standards, paramount considerations must be maximum economy in the part-time student's spare time and regard to his personal convenience.

There is lastly the question of the use the C.N.A.A. will make of its powers to give non-degree awards of university standard. This will depend upon the needs of the colleges, but briefly there are two possibilities. Awards other than degrees may be confined to cases in which there are special reasons for administering them along with C.N.A.A. degrees. Alternatively, the C.N.A.A. could eventually assume the responsibility for most if not all national awards for higher education courses in the further education system.

It is too early to say which is more likely to happen. The C.N.A.A.'s first and heavy task is to build up the new degree system. Yet it may not be fanciful to look forward to a time when C.N.A.A. qualifications will be the normal goal of students taking courses of higher education in the colleges.

The establishment of the C.N.A.A. is comparable in importance to the introduction of University of London external degrees. That was an offshoot of the first great expansion of higher education in the nineteenth century. It had unforeseeable consequences for the development of higher education and for the mobilisation of talent among sections of the community to whom the traditional avenues to degrees were closed. The decision to set up the C.N.A.A. is an expression of the educational revolution of the second half of the twentieth century. Its full consequences are no less unpredictable. We can only catch glimpses of the future through chinks in the curtains of today. But there is every reason to expect that its historical significance will be of the same order of magnitude as the institution of the London external degree system more than a century ago.

Teaching methods, as well as government policy, are likely to be influenced by the results of current educational research. This article looks at some current ideas on the subject. It introduces a series which will explain the results of projects financed from the Department's research fund.

Educational Research Today

MARTYN CLÉMANS

Speaking at the Annual Conference of the Association of Inspectors of Schools in October 1959, Dr W. D. Wall, Director of the National Foundation for Educational Research said: 'Over the last sixty years we have come to see that there are educational sciences which, within their scope, are as susceptible to scientific rigour as are the so-called exact and natural sciences. That they are not yet as rigorous or as powerful must be attributed in part to their relative newness—their growth is counted in decades whereas the medical and physical sciences count theirs in centuries.'

To the natural scientist much of the work that is designated research in the educational field may appear simply an elaborate form of market surveying or else as what might be called development. Research in the education context is sometimes a basis for making choices between alternative known characteristics.

The values dealt with are extrinsic, whereas in the natural sciences they are intrinsic to the material. Measurement is an essential part of all research, once it has gone beyond the purely observational stage, and judgments of the 'more' or 'less' kind are not absent even there. At present it is not possible for the education researcher to measure many of the things he would like to measure, nor if his definitions were made more precise would this necessarily solve the practical problem of devising the right instruments and techniques. Probably at the present state of knowledge some of the work that urgently needs to be done might best be called 'study' or 'evaluation' rather than research. But many educators have a profound distrust of any measurements other than their own more or less subjective assessments. To quote Dr Wall again: 'This distrust expresses itself in such statements as "there are many things you can't measure in education"—with the implication that it is only the trivial aspects that you can measure or that "values, religious, moral or philosophical, are what counts and these cannot be measured".'

There are at least three schools of thought about the future of social research. Some authorities feel that such research can never become wholly scientific, others hold that a limited area of scientific investigation will always be possible, while the third group take the more extreme view that the social sciences are at only an immature stage and that they will eventually become as truly scientific as physics or chemistry. Research in the scientific sense takes two forms; the head-counting, survey

type, and the interaction, process kind. Survey research is concerned with determining the nature of prevailing conditions, practices and attitudes. The objective is to obtain accurate descriptions of activities and processes and to describe the relationships that exist or identify trends that appear to be developing. The main tools used here are the interview, questionnaire and inventory.

Interaction or process research on the other hand seeks to find out the manner in which a particular condition or event occurs. Instead of confining its activities to observing and describing what exists, certain factors are deliberately manipulated under controlled conditions. To do this you must first identify and define the problem, next form hypotheses and deduce their consequences, and then construct an experimental design that represents all the elements and conditions. After carrying out the experiment it is necessary to interpret the data obtained and test its significance.

Experimentation is thus much more than a game of manipulating one variable to see what happens to another. It does not simply mean 'if I try this what will happen?'

Early in a research project an investigator must analyse the merits of the various procedures available for collecting evidence, sampling methods, questionnaires, appraisal techniques of various kinds and mechanical aids such as tape recorders. If existing apparatus or techniques do not meet specific needs the researcher must devise his own. He needs to be skilled in interpreting the information his tools produce; to know for example what the significance of an I.Q. score is, or the responses to a questionnaire. Just as in the natural sciences the days of the brilliant, lonely pioneer working in a back room somewhere and astonishing the world with his discoveries are over, replaced by team work and massive laboratory resources, so too has team work replaced individuality in educational research. Today the study of even the simplest problem might involve co-operation between an educational psychologist, a statistician, a sociologist, an experienced teacher and someone from the L.E.A. The complexity of the variables in any real problem, and the fact that the variation of one factor at a time and the exact duplication of any experiment are impossible, means that samples have to be carefully chosen, they have to be large, and the researcher must be aware of sources of error so that they can be statistically randomised if not controlled or eliminated.

What kinds of research need to be done? There are as many answers to this question as there are experts in education. One difficulty—soon to be remedied—is that no one really knows what research is actually being done at the moment. At present we have only estimates like that made by Professor Stephen Wiseman in the *British Journal of Educational Psychology*, in June 1959. Wiseman analysed the research results that had been published in the relevant technical journals in this country and the U.S. during the past twenty-five years. He found that research into learning (including the teaching and learning of particular subjects) took up 37 per cent of the research effort and work in the abilities field including measurement techniques and selection procedures 44 per cent. The remaining research time was divided between work on the professional problems of teachers (8 per cent) and on various aspects of emotional development (11 per cent).

The same year, almost the same month that Wiseman wrote, the Central Advisory Council for Education in its report on the education

of the 15-18 age group (Crowther Report) said: 'There are the most extraordinary gaps in our knowledge of what goes on in the schools and technical colleges we have today, let alone in the minds of the pupils. The Ministry's statisticians are constantly in the position of being asked to make bricks without straw'. And went on: 'When one moves from what is to what might be—the proper field of research—the absence of information is even greater. In view of the very large sums of money that are spent on education every year, the expenditure on educational research can only be regarded as pitiable'.

The Department's Programme

Large sums on education, but how much on research? In 1963 the Heyworth committee was set up to investigate the state of research in the social sciences. It estimated that by 1965 when it reported, the rate of spending on social science research from all sources—Government funds, local authorities, U.K. foundations and overseas, would be running at the rate of £6½ million a year. Of this about 11 per cent (£715,000) was being devoted to educational research. The Department of Education and Science research fund makes up a part of this total.

About 100 individual projects being carried out by university departments of education, by individual researchers and by research organisations are being supported from the D.E.S. fund. The total commitment for projects supported from this fund has now reached over £1 million. The work being sponsored covers all levels of the education system, from the primary school to university, as well as that into the finance of education, the relationship between sociological factors and education, and into increasingly important fields of television and programmed learning.

The projects are divided for administrative purposes into ten main groups: curriculum development (nine projects); schools organisations (nine projects); examinations (six projects); the provision of special services (six projects); further education (eight projects); university work (two projects); general topics (ten projects); teaching aids (thirteen projects); and social topics related to education (nine projects). There are also eleven other studies commissioned on behalf of the Central Advisory Councils for Education. Some of the work, like the study of the relationship between social class and responsiveness to education being carried out by the London Institute of Education, will last several years and cost many thousand pounds. Others are of comparatively short duration and correspondingly less expense but no less importance. One of these is an important analysis by the National Foundation for Education Research of the work at present being carried out in this field with the object of identifying any gaps that need filling.

The National Foundation for Education Research came into being as an independent body in 1947 (before that it had worked under the aegis of the London Institute of Education since its formation during 1943). The policy of the Foundation is largely dictated by the schools' requirements, and most of the projects it tackles arise out of the needs of local education authorities, for example in the provision of special and standardised tests. At present the Foundation is undertaking ten specific researches with the aid of grants from the Department of Education and Science. Among them is an investigation of the children in unstreamed schools measured against those in schools where children are streamed by ability at an early age, and an evaluation of the proposed

scheme for teaching French at primary level. The latter study will take nine years and cost £89,000.

A vast amount of research had gone into the preparation of the Crowther Report itself, as well as the Newsom Report (on the education of the 13-16 age group) that followed it four years later. But this was not the first time the Central Advisory Council or the Ministry had been involved in major research projects. In 1954 there had been a report on early leaving, and before that the study carried out by Professor Vernon on reading ability. Both of these were backed by important and detailed research. Equally important, H.M. Inspectorate had been in a unique position, since its foundation, to observe, make comparisons and assess the results of new developments in education. These were of necessity subjective judgments but were backed by wide knowledge and understanding of educational processes. Similarly during this period, and right up to the present time, officers of the various specialist branches of the Department have stimulated advances in fields like medicine and architecture.

A number of the projects supported by D.E.S. are on subjects covered by the Newsom Report. These include the study by the London Institute of Education just mentioned, work Liverpool University is doing on the relationship between environmental factors and educational achievement, and a moral development project by the University of Durham Department of Psychology. Others will contribute to the forthcoming Plowden Report on Primary Education. In this group are a study by the Central Office of Information on the way in which parents' attitudes affect their children's performance, and a long-term investigation by the National Bureau for Co-operation in Child Care on 17,000 children all born in the same week of March 1958.

Research and Innovation

Many people feel that research should be closely linked to the innovation now taking place in teaching methods and school organisation. Dr Michael Young (now Chairman of the Social Science Research Council) in his book *Innovation and Research in Education*, published in 1965, forcefully expressed the need for innovators and researchers to come together. 'The plea addressed to the innovator', Young wrote, 'is different from that addressed to fellow researchers. To the innovator the argument is that without research he will never be able to demonstrate with any real cogency whether his faith is justified, for whom and in what way. Without research, innovation will remain subject to fashion, liable to be swept away by the next enthusiast who can present his proposal with a show of charismatic brilliance. The proposal is that research should as far as possible be built into innovation, as a test of what is achieved. This may be a way of making innovation cumulative so that the initial impetus is not soon spent.'

It is of course much easier for teachers to become innovators than researchers. To introduce new ideas all you require is the will and the energy to try them out. At present the country is bristling with new ideas about education—new ways of teaching mathematics, new alphabets, new foreign language teaching, new syllabuses in science. Research into the effects of these changes is going to be vital if they are to be logically assessed.

Most teachers are likely to be appliers of research results rather than researchers themselves, although thousands of teachers have taken part

in National Foundation investigations, in projects organised by the Schools Council in support of curriculum development studies, and experimental examinations held in connection with the new Certificate of Secondary Education. Others have been involved in the projects sponsored by the Nuffield Foundation into new ways of teaching science, mathematics and modern languages—educational development rather than research as such.

As a result of the increased interest in research and the greater reliance that is likely to be placed on it in the future, it will become increasingly necessary for teachers and administrators to use a more technical approach to help them assess the value of any particular piece of work, and they will need to learn the jargon researchers use when talking to each other and to have an understanding of experimental methods which can assist judgment of the soundness and value of any project. A much more open mind will be required about many things that in the past were taken for granted. We will have to be prepared to see money being spent demonstrating the obvious, since firmly held beliefs of one generation become fallacies to the next. Nowhere is this more true than in education. Innovators and conservatives alike must expect to find the shibboleths they have had their elbows on demolished.

A heightened interest in children's writing is indicated by the publication of a number of anthologies on the subject in recent years. The author looks at some of them and comments on children as creative writers.

At First Hand

EDWARD WILKINSON

Our Jane is two.
She plays with a boy and
she has white hair and
she has blue eyes and
she has a runny nose and
she can't talk and
she eats biscuits and
she's fat and
she pinched my biscuits and
she's got a bike like an old cronk and
she plays with my train and
she's a monkey when telly's on.
She plays about.
She plays up and down.
They let her.

These lines were written by a six-year-old boy in an infant's school in a mining village in South Yorkshire. They can be found, along with many other examples of children's written work, in a book called *The Excitement of Writing*, published last year for the West Riding County Council. The book had a specific purpose in asking teachers in the Council's schools, all its schools of all kinds, to consider whether the working of exercises, of the kind found in so many manuals of English, is 'the best way of teaching children to write fluently, easily and with power.' The argument is clear and compelling, and it finds its force, as it must, in its illustrations of children's work such as this small boy's lines, at once fresh and finished.

Collections of children's poetry, or of their 'creative writing' in verse and in prose, are multiplying, although by no means yet a hundredfold. Perhaps it should be said at once that, for the purposes of this article, by 'creative writing' may be understood something like this. In much work in English composition (which occurs by no means only in English lessons) a child is required, and properly so, to carry out an assigned task, to write on a given theme, maybe record and reason in a standardised way. Where a child is free to write (even though helped to get started) on material of his own choosing—on something which he wants and needs to express, and where he is free to choose (although put in the way of being able to choose) his own form—then his writing may be called 'creative'. The material is his own experience, his own inner life, feeling and fancy; not only himself and what happens to him directly but also experience that comes to him imaginatively and sympathetically. Perhaps to such a description can be added the proposition

that the writing is creative because it is helping him to explore his experience, to map it and give it a meaning.

Some of the collections of writing are partly anthology, partly essays and studies on children's writings and, indeed, are often binding together articles published in the first place in journals. Many of the articles collected in this way come from that most useful debating-chamber for English teachers, the journal *The Use of English*. The educational weeklies and some newspapers, notably *The Guardian*, have reached a wider audience of teachers and parents—and others whose daily business is not necessarily in the schools—with accounts of work in progress. The B.B.C. has found space on the air for a number of broadcasts and space in the *Listener* for some scripts, while the title of one of its series of schools broadcasts, 'Listening and Writing' is a reminder that creative writing is twinned with creative reading or listening. The *Daily Mirror* has organised an annual children's literary competition for some six years, and has left the fearsome task of selection from a vast and increasing number of entries (last year 35,000) to what it rightly calls its 'distinguished advisory panel of judges.' The *Mirror* publishes in handsome format the fifty or so pieces which are selected each year. Among concerned teachers of English (which cannot be taken to be all teachers of English) a lively enough argument has been maintained about the aims of children's writing and the techniques for securing it; the founding at last of a professional body, the National Association for the Teaching of English, should spread the dialogues around, and amplify what has sometimes been attempted locally, notably by the London Association of English teachers.

At this moment there is probably still room for more examples of children's writing, at any rate at the top, where a compiler can pick and choose and offer some work which provides a standard for school magazines and booklets of school writing to measure themselves against, and which a number of people will continue to discuss and read with pleasure. It seems likely that for some years there will be as many readers who will come upon such writing for the first time as those who grow wearied by them. The achievements of children's painting are nowadays widely enough known and valued; nevertheless an anthology of simple reproductions, such as that provided by the appealing U.N.I.C.E.F. calendar for 1965, with its illustrations of art by children all over the world, is a useful substitute for the many who cannot get to the exhibitions and a considerable delight for those who have not met such work before. Meanwhile it would be foolish not to recognise that for some folk such collections are beginning to act as something of an irritant, and are provoking the first scratches and the first snorts of derision. Some of the bewildered efforts of students or young teachers who are 'doing creative writing' lead to alarm and resignation at the appearance of another masonic sign of bright, up-to-the-minute teaching. Clever children, of course, are quick to know what a teacher wants, and whether he falls for fairies or is a sucker for sex they can lay it on. Caldwell Cook defended what he called his 'boy poetry' as real poetry, as a work of art, by saying that his time as a teacher had shown him 'how fair and fresh a spring it will prove, if only we carefully refrain from putting it on tap'.

The protests are a natural enough reaction to the odd pretentious piece or the ill-judged personal selection or the compilation pushed into print over-hastily and made from too little material. A much more important

objection is the contention, which has all truth in it, that the educational job of such writing is to help the child and not to produce the potential author, a function for which wide publication is irrelevant. This contention would hold good for children's painting as for their writing. Nevertheless, it would be a thousand pities if impatient gestures, however honest and justified a response they might be, led to a knocking campaign when there are many teachers (and others) who have still to come across the published imaginative writing of the young. It is impossible to generalise. But even among heads of departments, even in any one area, sophisticated discussion is found side by side with utter lack of awareness.

The misgivings expressed over some of the work published is of far less concern than the way in which many people are quickly set by the ears, it may be as much by listening in to argument as by reflecting on the work itself. Such irritable exchanges spurt from a division in the English teaching world, the closing of which is of primary importance to the health and liveliness of the subject. More particularly so since it is an irrational division, grounded on unreal distinctions and false antitheses. This is not to say that the sparring isn't real, or that some of the distinctions which are made do not at times provide convenient categories for a number of purposes, something which is apparent in every wrangle over such terms as English language and English literature. Many published examples of children's creative writing (as the articles written around it often make plain) are the product of a way of looking at English which not all teachers are aware of or will accept. In so far as it suggests that other ways of teaching English are misguided, it fosters hostility among many who, very properly from one point of view, would regard themselves as good classroom practitioners.

Everyone knows the battle cries. Creative English is on the side of the gods, is progressive, is educationally left-wing, helps to dry up our cultural morass, helps the imaginatively starved child to mature; while everyday English is practical, related to the way in which children 'really' use language in the business of living, is down to earth and full of common sense. Since those who see the primary role of English as the cultivating of the imagination are still something of a minority they also suffer the fate of all minorities, that their lunatic fringe and their occasional layabouts and rogues are quickly picked upon. Again, some of their most able exponents feel that it is essential to be emphatic enough to catch the public eye if ever their case is to be heard, and emphatic gestures are misinterpreted. A number of American programmes of instruction have long distinguished between 'composition' and 'creative writing', and in so far as this provides, if you like, 'further English' for those who can gain from it, where other children may find satisfaction in differing art and crafts—it is a convenient, useful distinction. But it is not a helpful distinction if it blocks the understanding that 'composition' in English lessons for all children should comprise a good deal of creative work.

Perhaps it is sufficient at the moment that those who regard English as a creative activity should be taken seriously on the evidence of their accomplishments and that more teachers might be helpfully concerned with such writing (and listening and reading) than are commonly to be found. This could mean a change in direction, a shift in emphasis, of great importance to the future of English teaching. No question arises of a due care for the conventions of the written language—the teacher

who has a feeling for all the ways in which the use of the mother tongue can help a child is likely to be one who understands intuitively the guidance any one child needs. It may be true that the greater bulk of his class writing could mean that he is more likely to fall foul of the anxious parent who notes a mis-spelling left unmarked.

This is partly a problem of public relations between teacher and parent, though sometimes first between teacher and headmaster or administrator rather than the parent—to begin with, the ombudsman may himself be the complainant. Communication isn't only a matter of commas, and language only a matter of communication, although with intensified interest (and consequent greater care) communication improves, even as far as the commas. And interest intensifies when language is about its first business of mediating between man and his experience, of conducting the dialogue between self and soul. Picasso, who would seem to many an assured and confident painter, described a period in his life when he was dissatisfied with what he was doing and unable to find a way ahead. His solution came out of his fascination with the African masks in an ethnological museum, and he described his moment of vision in this way:

'Painting isn't an aesthetic operation, it's a form of magic designed as a mediator between this strange, hostile world and us, a way of seizing the power by giving form to our terrors as well as our desires. When I came to that realisation I knew I had found my way'.

For the child, 'a stranger and afraid, in a world he never made', painting can also be a mediator, and many would argue that language can be an even more powerful one.

Although creative writing is very far from being a new term it has not necessarily come the way of all teachers or been actively or seriously considered by them. Behind the interest and bewilderment there has been a long drag of uneasiness and suspicion. Some has come from the overtones which the word 'creative' has carried for so long of fine or fanciful writing, of writing concerned to imitate a form and not to convey feelings or judgements. Nor is this only a matter of fairies at the bottom of the garden, of the verse which forty years ago the educational world welcomed. This is the kind of verse, written in the model of Rose Fyleman's jejune tinklings, which was enthusiastically received when a volume *Verse Composition for Children* was reviewed in 1926.

I know where all the roses go—
To sunset land all bright
And grow again all pink and red
Amid the evening light.

I know where all the roses go—
To fairy land at night.
The elfins think they're very sweet
And keep them warm till light.

But many teachers are antagonised by a very different kind of writing, which, whatever technical skill it shows, also exhibits a precocious and sometimes pretentious maturity. A page of writing selected for a *Daily Mirror* book, and considerable skill it does show, begins:

> While he was yet a foetus in the womb, his mother drowned a breeding cat, and he was born nine times endowed, nine lives to live, nine deaths to die, but this he knew not then. He walked with his lusty love by the cliff edge, where the empebbled chalk dived down to a boiling, rock-tangle infinity below. He stumbled over the cliff edge and fell into the great cold emptiness of death . . . etc. through nine lives.

It might be better placed where it would be less likely to be misunderstood.

It is not easy to get a more acceptable term than creative writing for those who dislike it—for those who are already interested it is exact enough. 'Free writing' or 'free expression', which are intended to emphasise that the child may choose his own material and form, seem to be irrationally linked with free discipline and so are equally irrationally suspect. 'Imaginative writing' is a description very near the heart of the matter, but is liable to be misinterpreted as fantastic writing, the occasion for tales of caves and predictable criminals, of desert islands and improbable savages, of outer space and incredible objects. Coleridge needed more than a sentence to distinguish between fancy, the aggregating power ('no other than a mode of memory', 'no other counters to play with but fixities') and imagination the modifying power ('it dissolves, diffuses, dissipates, in order to recreate'). 'Personal writing' is a phrase which is increasingly used to describe that writing which seeks its material in the author's immediate experience, real or imaginary, and it has the advantage of an acceptable opposite, impersonal, for the seeking out of a term implies some distinctions. No technical term is long safe, and schools will soon be 'doing personal writing'. But what it is called will hardly matter if enough opportunities are there for writing at first hand.

It is sensible to be modest of the claims made for personal writing, or even that there is a completely hard and fast boundary between it and other works. This is so particularly in fields like history and religious instruction, and particularly in the primary school. In the infant school it would be a wasted labour to attempt any distinction. Most of the writing that takes place in most schools, certainly in secondary schools, is impersonal—and properly so. Learning to write down a statement, to compile a record, to make a digest, to put down notes to serve as an *aide-memoire*, to expand these notes into a lucid talk or a logically developed written argument makes up the bulk of children's writing.

There are forms which have to be acquired, such as the conventions of describing experiments in science or of succinctly recording geographical data, along with the help of diagrams and tables and charts and graphs and formulae and sketches. All of these speak for themselves.

Such work involves the recall, the hunting out, the selection of facts and the drawing of inference; four-fifths of the work in school will be of this kind anyway.

Such work leads to straightforward accounts, factual surveys, discussion. Some forms of written work, for example the writing of letters or the construction of instructions and notices, are sometimes most easily practised in English as part of the business of communications. It is only a fraction of the time for writing which could provide opportunities for personal writing—undirected writing, of a kind that the conventional essay of the last hundred years of schooling has not provided for the great bulk of children, whatever it may have done and still does for the bright few.

Sometimes there is little enough continuous writing practised at all, pushed out by here's-how-to-keep-them-occupied manuals and workbooks, at their worst little more than collections of puzzles and general knowledge questions. In some schools, particularly some primary schools, concerned to provide opportunities for individual or group

work on 'topics', or 'projects' or 'centres of interest' stimulating the use of books and even the very provision of books, there may be a good deal more writing. This writing has the virtue of drawing upon a theme a child has chosen or is happy to write of and has had the chance to read or talk about. He is, as the jargon runs, involved in his subject and writes all the more readily and all the better for it. Such work has its own trap in that a child may partly, even largely, reproduce the text of the books he has consulted. A school which provides occasions for a fair amount of writing may not manage to include opportunities for personal writing.

The exercise of writing from first-hand experience has important educational virtues. It is an open teaching situation in which the child and the teacher are on equal terms, for since the starting-point is the child's own experience he cannot write away from the subject—there is no correct answer. And the most deprived child has illimitable experience to draw upon. It thus provides a valuable counter-balance to most of the other teaching situations of the day.

Outside deliberate slovenliness or disregard, the child's work has value, and the teacher is the more likely to show sympathy and be able to evaluate it helpfully. The child is involved in literature, it is something which happens to him, which he brings about and causes to happen. Just as the study of history may begin to flower when the child realises that it is about him and his parents and the place where he lives, that he and they and it are part of history, that he is literally part of the very large number of ancestors he had a thousand years ago, that 'there are no dead', so literature may take on more meaning when he realises that he writes it—even if he can't spell.

It is not new for commentators to plead the essential virtues of writing at first hand and from the heart. A hundred years ago Matthew Arnold placed in juxtapostion two letters, one written 'by an ordinary scholar in a public elementary school in my district, a girl of eleven years old', and the other 'by a boy in a private middle class school, and furnished to one of the Assistant Commissioners of the Schools Enquiry Commission'. Arnold's chief concern was to illustrate how primary schools compared favourably with the 'private adventure' schools of the middle class, and he set out to demonstrate 'the stamp of plainness and the freedom from charlatanism given to the instruction of our primary schools', by commending with some warmth and passion the idiomatic language the girl was encouraged to use.

Her letter ran:

> Dear Fanny—I am afraid I shall not pass in my examination; Miss C—— says she thinks I shall. I shall be glad when the Serpentine is frozen over, for we shall have such fun; I wish you did not live so far away, then you could come and share in the game. Father cannot spare Willie, so I have as much as I can do to teach him to cipher nicely. I am now sitting by the school fire, so I assure you I am very warm. Father and mother are very well. I hope to see you on Christmas Day. Winter is coming; don't it make you shiver to think of? Shall you ever come to smoky old London again? It is not so bad, after all, with its bustle and business and noise. If you see Ellen T—— will you kindly get her address for me. I must now conclude, as I am soon going to my reading class; so good bye.
> From your affectionate friend,
>
> *M*——

And the boy's:

> My Dear Parents—The anticipation of our Christmas vacation abounds in peculiar delights. Not only that its 'festivities', its social gatherings, and its lively amusements crown the old year with happiness and mirth, but that I come a guest commended to your hospitable love by the performance of all you bade me remember when I left you in the glad season of sun and flowers.
>
> And time has sped fleetly since reluctant my departing step crossed the threshold of that home whose indulgences and endearments their temporary loss has taught me to value more and more. Yet that restraint is salutary, and that self-reliance is as easily learnt as it is laudable, the propriety of my conduct and the readiness of my services shall ere long aptly illustrate. It is with confidence I promise that the close of every year shall find me advancing in your regard by constantly observing the precepts of my excellent tutors and the example of my excellent parents.
>
> We break up on Thursday the 11th of December instant, and my impatience of the short delay will assure my dear parents of the filial sentiments of
>
> Theirs very sincerely,
>
> *N*——
>
> P.S.—We shall reassemble on the 19th of January. Mr. and Mrs. P. present their respectful compliments.

Arnold put the difference down to the work in the primary schools being approved by impartial educated persons, in the other by the common run of middle class parents, an observation which might no longer be exact to-day, but which has some obvious parallels.

The tradition of the 'model' is by no means dead, and John Blackie, in an essay 'Inspiration and Craftsmanship' in the volume entitled *Good Enough for the Children?* puts side by side two written pieces of the 1940s which make an even more violent contrast than Arnold's pair. *The Excitement of Writing* quotes a most interesting comparison of passages written by a great-grandfather and great-grandson whose birthdays were 100 years apart. The 1864 passage is more finished, polished, correct—the kind of words that might be used to describe it. But it is essentially reproductive, laboriously directed by the boy's reading. The 1964 passage is more hurriedly written (it was a piece of homework) and consequently carelessly put together, proceeding fitfully along its way. But it is individual, not the kind of work which an equally able boy in the next desk might be handing in, not the scrupulously turned out copy of a model his ancestor's is.

James Britton, in an article 'Growing up in writing' reprinted in *Young Writers, Young Readers* has a similar juxtaposition. A piece of writing, as full of sweet feeling as it is of grammatical errors, is set beside one which is formally acceptable but where the experience is so far removed from first-hand that it is empty of feeling.

(a) I am a naturelist. I was out one day looking for naturelisation when I saw a dead rook in a stream. A cat from one of the nearby houses probably killed it, there were only three cats nearby, a black one, a white one and a tabby.

So I thought I would do a bit of detection, inserdentally the black one was a tom cat. So I thought he might have done it. I saw the three cats playing together. But not one had a trace of killing a rook.

Just then a dog came along with a few black feathers on him and he was all wet so now I know who did it.

Being a naturelist I have a lot to do with keeping animals. I have 5 cats, 3 rabbits and about 200 bees, and 5 lizards which I play with in my garden.

I often found hurt burds there. Once Jack and I found a little tit dead and we buried it. That is how to be a naturelist.

(b) My mother who derives a great amount of pleasure from shopping is also having a pleasant holiday. There are many sea-front shops and the main shopping centre is not far from the beach. These sea-front shops have many souvenirs and small gifts for sale at very reasonable prices and I intend to visit one this morning to buy some gifts and postcards.

It can be seen indirectly but more immediately in a passage from another source *Free Writing*, where Dora Pym describes experiments made in Wiltshire some fifteen years ago to try to solve problems of teaching and testing English. In one of these experiments a group of ten-year-old children was asked to write after examining a deliberately constructed picture. One child began:

'In this interesting picture is a boy and a girl, they are down by the sea. The girl is sitting to the table eating a banana. It makes me want to make that picture come to life. Well, let's go back to composition. On the table are some more bananas, fruit and iced cake and some fancy cakes and bread and butter . . .

Yet it should be recognised that not every teacher would anticipate these judgments and, faced with them, some would reject them immediately. Others would be worried at the suggestion that adherence to the norms of spelling, punctuation and sentence structure should not be regarded as the prime virtue.

A century of tests and examinations broods over everyone. A primary school teacher set her ten-year-old class to write on the title 'A Rainy Day'. One girl wrote a delightful lively account of the meeting of her pony club, but maybe aware of what might happen, ended prudently: 'The day of the pony club meeting was a rainy day'. The teacher gave her no marks and commented 'Off the point'. What, for a ten-year-old girl, is the point of writing? John Blackie gives a more fretting example. A class had been set to write on 'My father', and one nine-year-old boy entitled his work 'My real father', something to be alerted by in itself. This is what he wrote:

'My father is on the broad side and tall side. My father was a hard working man and he had a lot of money. He was not fat or thin. . . . His age was about 30 years when he died, he has a good reputation, he is a married man. When he was in hospital I went to see him every Sunday afternoon. I asked him how he was going on, he told me he was getting a lot better. My father was very kind to me and gave me and my cousins cigarette cards. He likes doing woodwork, my father, for me, and he likes a little game of cards now and then; or a game of darts. He chops the wood and saws the planks and he is a handsome man but he is dead. He worked at the rubber works before he died'.

On this intensely moving piece the teacher commented: 'Tenses. You keep mixing past and present'. This might be the comment of an utterly insensitive teacher, but perhaps it is the comment of an utterly committed one—or an utterly bewildered one, not knowing what he wanted to say, taking refuge in 'grammar'.

Nevertheless, comparative unanimity about criteria of successful writing has given way over the last thirty years, and especially over the

last ten, to marked differences. In an article called 'Marking Composition', in the collection *English in Education*, W. H. Mittins describes an investigation into the assessment of written work. He used material first employed in 1934 for a similar purpose, and shows that whereas the original assessors were almost entirely concerned with evaluating the control of the techniques of putting words on paper only about half of the recent assessors were. The other half were more concerned with the individuality of what is being written down.

There is no disagreement that the author who wants to share his experience with others, as much as the student who needs to record information or support an opinion, must learn to put his words down in an acceptable way, if he is not to be misunderstood, particularly when his material grows more complex. Equally, there should be agreement that the writer of model exercises is capable of individual writing and, if he has not so far produced it, that he is not damned for ever. He is the casualty of a tradition, and can come to know that he is more interesting when he is writing at first-hand. The evidence grows that skill and confidence accrue more quickly when writing is at first personal, individual, local, and when occasions for such writing persist.

It is in the business of getting any distance with personal writing that the last fifteen years have been most fruitful. For a long time the first weeks of an autumn term, expecially in secondary schools, have asked for pieces of writing called 'On Myself', 'My Street', 'My Town', 'Meet My Family'. A considerable advance is to be seen in the genre because teachers accept a child's reactions to its home without any moralising, reflecting a much wider understanding of the nature of child development.

The point may be illustrated by a routine piece written a short time ago by a nine-year-old girl in less than half-an-hour in school—it is sometimes easy to forget that we make considerable demands on all children to sit down and write spontaneously, even when we have guided them in. This girl, too, mixes her tenses, but effectively, although almost certainly without thinking about it. It is only at the end, in the rush to finish it off and hand it in, that she goes wrong.

> 'My nana came last Sunday and I hated it. I came home from riding and went into the lounge and there was my Nana in in curlers, sitting down having a cup of tea. Immedately she said "Have you got a kiss for Nana then". Mummy gave me a nudge and I went up to her. I did feel a fool.
>
> Then its the same routine. I have to make a cup of tea for her. Ive never known anyone so fussy.
>
> Next I have to try a nighty on while she measures me and comments on me. Then she changes the subject and I decide to swich the television on. I put it on and turn it up quite loud because I can not hear. Then I get told off because it is to loud. Then I turn it down and can not hear so I storm off into the garden and meet Grandad half way. I do not like kissing him because he has a rough beard and his bristles hurt me.
>
> So I go into the garden sit on the swing and sulk. I do not like it when visitors come because we have to wear frills and stiff petticoats. Then Mummy tells them to come and see my bedroom so I rushed up and shoved things under my bed and sometimes out of the window. Then they came up and went home.

Such preliminary work, however, may then sometimes give way to

essays on 'A Railway Station', and settle into a routine of descriptive, narrative, and epistolary exercises.

Some of the gain can be measured by turning back to that talented erratic teacher, Caldwell Cook, who had so much of importance to say if he could have grown away at all from his own little boy, middle-class, preparatory-school world. His jargon is now only a literary curiosity, but he has at times embarrassed or antagonised too many with his world of 'Littlemen', the 'Ilonds' they invented and wrote about and built, the 'baton wagging' exercise he took so seriously.

Perhaps he never managed to carry play over completely into creativeness, to pass from fantasy to imagination, or to admit that language has other functions as well as origination. Few of the verses that his pupils wrote would be singled out for an anthology of good work to-day—in them fairies swing in acorn-cups, naughty little mice bob their heads out of their holes, English sea-dogs who know not such a thing as fear meet the haughty Spaniards, the Lady Moon tips the leafy bowers of that fair queen of the woods, the silver birch. The poetry, like Cook himself maybe, stayed on with Peter Pan.

In the fifty years since Cook's *The Play Way* was published school magazines have long included occasional or more than occasional school writing, or issued anthologies called 'Songs from a Northern School' or 'West Country Voices'. But the writing (usually verse) is often poor when measured alongside similar writing to-day. The young authors have gone on, as under-secretary or industrial chemist, as soldier or teacher, and no longer write, not even if a house magazine is open to them. The school magazine contributions of established writers, when they can be dug out of library cupboards, do not always foretell their future. The point of such writing is not in the future but in the present, and the school can provide the occasion and the stimulus from five till eighteen.

Small children can be helped to a pattern of expression which can give great pleasure to them and to their readers, and that is what the small boy quoted at the beginning, writing of his indulged younger sister, Our Jane, was able to do. He holds his breath after his torrent with the slower repetitive phrases 'She plays about. She plays up and down' to let himself squeeze the trigger, and then fire his satisfying bullet of exasperation against the world of irrational authority, 'They let her'.

Yet he is writing essentially in the string of simple sentences that small children use, such as these, written in a school not a hundred miles from the one in which Jane's brother was taught.

> One day ther were a cing and his name was tarquin. he was sent of the throne by the people and he went to the King of Etruscans and he had a great narmey and he helped Tarquin and they came withe there narmey and a mes ingere came to rome and said that ther is a narmey coming to wareds rome so they sent a narmey of soldars to fight thees soldier and they was defeeted and they was onley one thing to save rome and that was to nok donne the brig. and . . .

Or another small boy of his own age in still another nearby school, writing desperately his diary entry for the day without any guidance or help.

> 'To-day our trimmings have fallen down and they fell on the table and we had to put the trimmings up on the window and they have stopped up on the window and they have stopped up now and I am gad they have stopped up'

A book by an East and West Ridings Committee of teachers on poetry printed this delightful example of the result of encouraging repetition and pattern in the writing of an even younger child, a five-year-old:

> 'Little hen, little hen where are you going?
> I'm going to my nest to get some crumbs,
> Goodbye horse
> Visit to-morrow.
> Little birds fly up in the air,
> Up and down, and by and by
> Little birds fly down again
> Goodbye birds'.

The right shape, the right word comes with the struggle to get feelings on paper for a sympathetic reader.

In the Central Advisory Council report *Half our Future* a short piece of writing is quoted from a slum school in the north, by a fifteen-year-old girl:

> At a half past four every morning the alarm clock goes off. Then I know its time to get up. I get dressed and then go down stairs into the coldness. First of all I put on the kettle. While that is boiling I make the fire. I make my fathers porridge and shout him up for work. When he's gone I get my sister up for work. When she has gone I clean up then get ready for school. After that I shout my brother up and help him to get ready for school. Then I call my mother up.

This is a scarifying human document, but it is also a technical achievement; her inert endurance of four dragging hours in the lonely kitchen are well conveyed by her mechanical repetition, but the phrase which strikes to the heart is 'go down into the coldness'. The force is unexpectedly in the abstract word—as more expectedly with other authors.

Teachers now have available to them a number of accounts of pioneer work of ways in which imaginative, creative writing may be encouraged, and two points from them are worth isolating.

The first is the need which creative writing makes obvious, to help children to perceive accurately, to increase their awareness of their own sense impressions, to see more clearly, hear more sensitively, feel more acutely. With this must go help in finding ways of communicating their impressions and of entering sympathetically into situations outside their experience.

The second is the need to feed the imagination if children are to be exhorted to use it. Obvious enough, not new—good teachers have always been teachers who read widely and deeply themselves, and found the right material to give their forms. But this principle does give a touchstone in the selection of material, for that well-established exercise, the attentive study of a passage of (usually) prose, still called comprehension'. Too many 'comprehension' books, an important part of what Matthew Arnold called 'a lucrative and important business', deserve his comment on the anthologies of his day. 'It is provoking to think that such rubbish is palmed off on a poor child'. The publishers, of course, have their retort. Some of the books which select their material thoughtfully follow a conventional course book pattern, but are pointing the way for teachers not yet confident enough to fend for themselves. At present comprehension exercises too often end with a class which has 'got the meaning but missed the experience', to borrow a phrase quoted in a journal which gives a good deal of help to English teachers, the *Critical Quarterly*. Such a phrase marks the division among teachers,

between those who find it pointless and those who feel it to be pithy.

As the child grows older he not only recounts and reshapes his experience but begins to interpret it. An illustration of this may be taken from a little manual called *Let the children write* which is an account of how one teacher drew from her class creative work which she termed 'intensive writing'; the label is not important and in any case has not stuck. The theme was 'aloneness', and the author describes the way she prepared the class to write. These lines were written by a fourteen-year-old boy:

> I went to the shed for a cigarette. Mind, I was not allowed to smoke, and if Dad caught me, there's no telling *what* would happen.
> I lit it
> And puffed.
> What's that?
> Quick as a flash the cigarette is out and I stand with beating heart, waiting.
> It was only the door, swinging and creaking in the evening breeze.
> I lit up again
> And puffed.
> The door opened with a push and a clatter, hitting, storming, searching out the sinner.
> Without waiting to think, I dashed out, down the path round the corner, and indoors.
> Safe?
> Safe from myself?

With the help of the right stimulus the child can penetrate more deeply into human relations, and such a stimulus can be given from a wise choice of author. Work of this kind is going on all the time in schools with no thought of publication, and can produce a pedagogical problem which a number of teachers have emphasised in describing their methods. A teacher has to learn to take whatever the child writes, and judge it on its face value, as he ought to acknowledge and discuss with them all of their reading, without moralising.

Some pieces would not easily permit class discussion and criticism, a technique of value with personal writing as with any other. There may seem to be elements of defiance, of seeing how far they can go, but it is not necessarily impertinence—they are trying to get hold of their difficult, amorphous feelings. This is not psychotherapy, no more than the help most people have needed at some time in their lives. The stricken child does need therapeutic treatment, and creative activity can assist him to come to terms with himself.

By 1975 over 100,000 computer personnel will be needed—designers, analysts, programmers, operators, maintenance engineers. How should they be educated?

Education for the Computer Age

D. G. TOOSE

The revolution in the application of computers, on the scale of the expansion that has taken place in the United States in the last few years, has found the United Kingdom educationally only half-prepared and the industrial and business community slow to realise the great potential of these machines. In spite of the leading position occupied by the United Kingdom in computer design and development in the early 1950s, and the current high standing of our manufacturers, Britain is grossly under-equipped in operative computer installations, particularly in respect of very large systems. It has been estimated that in July, 1964 there were some 15,000 computer systems working in U.S.A. where a rapid rate of increase is still taking place. Britain has just over 1,000 computers at present, with 400-500 on order, so that on a population basis our current provision is roughly 25 per cent of that of U.S.A. and under 50 per cent using gross national product as the yardstick. On the same basis, our position compares unfavourably with that of most highly industrialised communities. For instance, the number of installations in West Germany was 1,413 (population 58 million) compared with 948 in the United Kingdom (population 53 million).

Management generally has been slow to recognise the breadth of the technical and organisational breakthrough which the advent of the fast reliable computing machine has made possible, both in streamlining routine business operations and in making available useful information previously uneconomic to collate. Possibilities for the effective control of processes, for production planning in all its aspects, and for budgetary and financial operations, are only just being realised on a wide scale. There is, hopefully, a national awakening to the need to utilise the power of computers in industry and commerce and a recognition that these machines must play an increasing role in the functioning of society.

It seems highly probable that after slow beginnings a sudden increase is imminent in the number of installations in Britain. Estimates of the size of this explosion vary considerably, but it has been consistently forecast that over 5,000 computers will be in use within ten years. Staffing these installations poses immediate problems, in terms of the number of personnel required and the provision of the necessary training and education. Brian Murphy, of International Computers and Tabulators Ltd, writing in *New Scientist* in June last year estimated that a total of 110,000 personnel will be required, some 10,000 of these employed in the design and development of machines and the remainder directly on installed computers.

While it would be unwise to take Murphy's figures as more than guide estimates, he is undoubtedly making a prediction that should be taken

seriously. A start has been made in devising schemes for the education of computer staff, but in relation to the numbers mentioned by Murphy a much more comprehensive plan is needed. This should be put into effect as soon as possible, but before considering the problem in more detail, it will be useful to survey the work for which staff must be found.

An automatic (stored 'program') digital computer is a machine system which can accept information, process it as instructed, and present the results in a form humanly understandable, all without the intervention of any human operator. The speed at which the internal processes are executed depends on the rate at which information in the form of electrical pulses can be manipulated by the circuitry of the machine. In the current generation of transistorised computers this is extremely fast (giving the equivalent of tens of thousands of arithmetic operations per second), and the machines themselves are highly reliable in the engineering sense. Computers are basically designed as binary machines on grounds of economy and reliability, i.e. they are able to recognise and process information only if this is presented as binary (two-state) signals. In terms of such binary signals, the central processing unit (CPU) of the computer can perform the arithmetical operations of addition, subtraction, multiplication and division, can compare two numbers, and also has the associated logical facility of two-way decision taking. The logical facility is a vital one, though it is merely the process of taking one of two possible predetermined lines of action at some stage.

The CPU is therefore a very fast, reliable calculator with a simple logical facility and extensive memory, capable of processing data presented to it in a binary (numerical) form. It can only do this, however, under detailed directions given it in the form of a program and stored in its memory. The program consists of a sequential breakdown (with branching instructions at decision points) of the procedure to be carried out, and is controlled and presented to the CPU by a Control Unit, which also governs the operation of the Input and Output Units. Communication with the Control and CPU must be via mechanisms that will convert binary information signals recognisable by the human operator into binary signals recognisable by the machine and in reverse for output.

The particular form and size of a computer configuration will depend on the range of tasks to be performed, and this must be decided after an extensive pre-purchase exercise conducted by the systems analyst, but considerations affecting the 'hardware' (machine) are usually influenced by the 'software' or programming material associated with it. The process of instructing the computer in its execution of work demands the successive phases: Identification of the task and its object; Mode of solution/processing to be adopted; Program; flow-charting; coding; documentation; Preparation of program, including both data and instructions in a form acceptable by the computer.

In the fields of government and administration, defence, distribution of goods and services, finance and research, extensive use has already been made of computers, sometimes much more sophisticated versions of the basic systems described above. It is impossible here to do justice to the range of applications, but in general any situation involving the processing of large volumes of information (however simple the actual processing may be) is a suitable one to be exploited in this fashion. Three main types of application can be discerned—in control, in routine data handling, and in research and development. Control of weapons,

satellites, machine tools, TV transmission sequencing, and of the production of, for example, chemicals, steelstrip and glass are typical control applications. Routine applications utilise the power of the computer in fast, accurate repetitive computations and data-processing and its enormous never-failing memory. Maintenance and up-dating of sales and stock ledgers, invoicing and control of stock and purchasing policy are standard business applications. Massive computational capacity allied with ever-increasing speed has established the computer as the foremost research tool, making possible the solution of problems that had proved intractable by analytical methods or which were hitherto too immense for solution by manual means.

It is clear that the computer has had, and will increasingly have, an immeasurable impact on all sciences and technologies, on business and management, and on many of the social studies amenable to forms of quantitative analysis and inference. This must clearly have repercussions educationally, both in the training of specialist computer personnel and in the formal education of virtually all technologists and higher technicians in all disciplines.

While it is essential that the teaching in the schools should be conducted with an acute awareness of the place of computers (and indeed, technology generally) in modern society, it is doubtful whether this can, or should, play any significant role in terms of vocational training. It is very encouraging that many of the more recently designed mathematics syllabuses in schools do include some treatment of relevant topics such as linear algebra, statistics and flow-charting of suitable algorithms. Such inclusions can be properly justified, but any extensive specialist extension to include, for example, more than an introduction to program coding or the installation and use of computers in schools, would need considerably more justification. It is probable that, for the next ten years, the computer needs of the schools can be adequately met by the use of installations in neighbouring institutes of further education as these become available.

It is in further and higher education that we must produce the staff required for the computer era. At the moment the universities are inadequately provided with computer facilities, but it is probable this situation will change quickly and that within a few years most will have installations of speed and capacity sufficient for their research and teaching programmes. By suitable re-orientation of technological, scientific and business courses, it can be anticipated that eventually the majority of graduates from these courses will be fully aware of the power of computers and the effects on their particular disciplines. While the universities will, rightly, regard the computer as an essential research tool, it is to be hoped that its use will be developed as part of the general teaching programme for undergraduates in appropriate disciplines. The universities, either directly or indirectly, should make a much greater contribution to the specialist needs than they are able to do at present through their range of postgraduate courses.

It is equally important that the courses for technologists and higher-grade technicians offered in the technical colleges should take adequate account of the computer-based environment in which most of the students will be engaged. All C.N.A.A. (formerly Diploma in Technology) courses in mathematics have always been computer-oriented to some degree, as are an interesting proportion of those in engineering and science. Courses at national diploma level must be similarly redesigned,

as should corresponding courses in the field of business studies. Some 90 per cent of current computer installations outside educational establishments are employed mainly in commercial data processing rather than scientific computing, and it is likely that this proportion will be maintained; it is unfortunate that the majority of courses in business studies contain little material relevant to computer-based data handling. The general trend in the technical and commercial colleges must be towards the introduction, wherever possible, of computer-biassed studies; and it is a happy omen that many colleges, often under difficulty, have already attempted so much in educating local firms in this respect. To influence management by means of *ad hoc* special courses and conferences is, perhaps, as crucial a task facing them as the reorientation of their regular courses.

There are some twenty-five computer systems of various generations and sizes in the local authority colleges, and it is expected that the work in this sphere will so develop that this number will at least double within five years. This should enable colleges to play an increasingly effective role in computer education, both vocationally and as centres for the related work of neighbouring schools.

If we were to take Murphy's figures of specialist computer personnel for the 5,000 installations forecast within the next ten years, based on the present employment pattern, this would demand something in the order of: Systems designers 10,000; Systems analysts 28,070; Programmers 37,960; Operators 23,180; Maintenance engineers 7,360.

The training of these classes of personnel (where they are not self-taught) is at present largely undertaken either by the computer manufacturers or within the installation organisation. While it could be anticipated that the manufacturers would prefer to continue to train suitably qualified staff as designers and maintenance engineers, it is not reasonable to expect them to continue to be the main suppliers of the other classes, even for only half the demand; and it is inevitable that the educational system should take a heavy share in this provision.

Systems designers, in relation to both hardware and software, will be engaged mostly by the manufacturers. The latter will produce some of the 10,000 staff required by training graduate engineers and mathematicians, accountants and others of similar status, but a desirable new range of undergraduate courses may also make an important contribution. Four colleges of technology (Brighton, Hatfield, Stafford and Wolverhampton) and Manchester University intended to start first degree courses in computer science or technology in October 1965. It is hard to forecast accurately what progress towards Murphy's target figure will be achieved by the five institutions, but a total of 1,000 graduates may be optimistic. Some other universities are running valuable post-graduate courses in related fields, but the numbers of students are small (probably, at current rates, less than 1,000 in ten years). It therefore seems doubtful if the total planned provision will be sufficient, even if all the graduates concerned remain in computer work and are systems designers rather than analysts or programmers. A considerable extension of the present proposals and a large-scale programme of retraining are therefore urgently needed.

The future supply of programmers may be brighter, but cannot be regarded too complacently. The coding and routine parts of programming do not demand personnel of graduate or any other current academic qualification, given some aptitude; and through the initiative of

the British Computer Society's Education Committee and the good offices of the City and Guilds of London Institute, a scheme for the education of junior personnel has been devised. The certificate scheme provides for the education of operators, junior programmers and computer room personnel, and the advanced certificate course will enable some of these people to progress further and also to provide a possible retraining avenue for older personnel entering the computer field. Eight technical colleges and colleges of commerce ran the course in its first year on a part-time day basis, and 20-30 more will be offered courses in the current session. If employers can be brought to recognise the value of such courses, this is a strong potential source of trained staff, as many colleges are prepared to offer courses on block-release or full-time basis, sometimes with the addition of GCE advanced level studies. The proposed HNC courses in mathematics, and the equivalent possible full-time or sandwich courses should produce a rising number of programmers for scientific and engineering applications, but some thought must be given also to the provision of similar courses designed to train general-purpose programmers.

One of the most pressing needs must be to consider the training of the large body of systems analysts who will advise on the installation of computer systems in various businesses. These will act, within an organisation, as consultants. They will analyse the requirements of the entire firm in terms of information handling and processing and will advise on the details of the computer configuration most suitable for present and future needs—or maybe advise against the installation of any computer at all. They will have to be able to influence management at top level, and will probably need, in some depth, a sound appreciation of commercial procedures and how they arose. They will also need to understand the role of the office and the development of office equipment, to know the legal requirements regarding installations and commercial practice, and to have some programming experience. If any attempt is to be made to achieve the ideal of fully integrated data-processing within the firm, the systems analyst should also be aware of the engineering and research aspects, and may have to appreciate the problems arising in the areas of production planning and control, and the use of the tools of operational research in this and the research field. The only source of such staff at the moment is the manufacturers, who have, necessarily, to train their own. On the scale of the estimated requirement, the potentially wider resources of technical institutes may offer the best chance of matching supply to demand. Provided suitable courses could be defined and agreed by those most directly concerned, it should be possible to mount a crash programme of training for systems analysts (or any other computer staff) in the technical and commercial colleges, suitable students being released by their employers for, say, four to six months full-time study. It may be that some teacher training would be necessary as a preliminary, but the manufacturers would almost certainly be prepared to give extensive help if a realistic programme providing the computer personnel was thus made feasible.

It is suggested therefore that the proposals made to date for the education of computer staff are plainly inadequate and that the supply situation will become ever more critical. The staff must be trained and our response to this challenge will have a profound influence on Britain's competitive position in the world.

The Department is regularly advised—by inspectors and officials—of developments in other countries. Some of these reports from abroad will appear in TRENDS.

The Challenge of the Consumer

Adult Education in Switzerland

H. J. EDWARDS

In Switzerland there is no system of evening institutes run by local authorities as we have in this country. The gap is filled by private enterprise. When the great Migros Corporation, founded by millionaire industrialist and visionary Gottlieb Duttweiler became a co-operative in 1941, a scheme was introduced by which one per cent of the gross profit of the Federation and one half per cent of that of each co-operative would be devoted to projects for the social, cultural and economic benefit of the Swiss people. In 1964 the turnover of the Federation of Migros Co-operatives was 1,712 million Swiss francs, about 140 million pounds.

Duttweiler's enterprise had begun in 1925, when, with borrowed money, he started cut-price retailing from open trucks, but it had soon expanded into other fields. He started a scheme to give the people of Switzerland cheap holidays abroad, brought newspapers, went into manufacturing as well as marketing, and began operating petrol stations. Wherever he thought there was a price to be cut he cut it. *The Times* wrote when he died in 1962: 'His immense energy and his indomitable will led to a veritable revolution in Swiss ways of life.'

Towards the end of World War II, there grew up a demand for classes in languages as people looked forward again to unrestricted travel. Gottlieb Duttweiler set up classes. Soon he expanded them into adult schools to meet the much greater demands for classes in all kinds of subjects held at convenient times in the day and evening in reasonable comfortable premises. From these beginnings grew the Migros Club-Schools for Adults of which there were fifty-eight in 1964 with 164,896 students enrolled. Language classes continue a principle feature and account for about a third of all the teaching, but as in this country large numbers of students enrol for skilled hobbies, art and crafts and physical activities. Altogether some 280 subjects are now taught, a list similar to that given in *Floodlight*, the Londoner's guide to evening classes. In the Club-Schools all the subjects are strictly non-vocational: typewriting for instance is taught only on portable machines as a personal skill for home use; languages are taught for individual enjoyment not for professional purposes. No examinations are taken.

There are fifteen regional co-operatives serving all parts of Switzerland in the Migros Federation. Each has a full time Director of Club-Schools whose duties are similar to those of an area principal with one of the larger local authorities in this country. In Zurich the director looks after three large centres in the city and two smaller ones in nearby towns. In the Canton of Wallis there are five small centres, each with a secretary in charge.

A director is responsible to his co-operative and runs his Club-Schools as a department of the co-operative. He receives annually from the co-operative a grant equal to a half of one per cent of the gross turnover and the remainder of his income comes from student fees. Within these limits, and within the general policy of the Migros Federation he operates quite freely. In practice student fees cover about 85 per cent of the operating costs. The director is able to fix class fees according to his estimate of the market demands. If he is introducing a new class he may attract students by a low fee. He can maintain a steady income from well-established classes. He can and does waive the fee altogether for meetings of particular groups such as old age pensioners. Class fees are paid monthly because it has been found that most people prefer to commit themselves for only a short period ahead. Many of the classes continue from September to July but the students are free to join or leave at any time. Some classes are arranged for periods of one, two or three months and these too are so arranged that students may join at any time. Only in a relatively few courses, such as car driving or the introduction to dressmaking, is there a progressive course in which the sequence must be taken as a whole.

One result of this approach is that enrolments are not bunched together at the beginning of terms but are going on constantly. Moreover, as each club-school has adequate secretarial staff on duty throughout the day and evening, there is no waiting or queueing to pay fees. Fees for classes vary from 7 francs (about 12s) for four one-hour lessons in language classes, to 30 to 40 francs (£2 10s to £3 6s) a month for other courses. Handicraft classes are usually 14 francs (£1 4s) a month for four two-hour classes; photography is 42 francs (£3 10s) for eight two-hour classes and two half-day excursions out of doors; a riding course costs 72 francs (£6) for eight one-hour lessons.

A Flexible System

The director is free to make his own staff arrangements. All the teachers are part-time and engaged by the director at rates which differ according to the ability of the teacher and the difficulty of the class he takes. Few of the staff are trained teachers and many have to be given help in finding the best ways of teaching adults. The director takes this as one of his main responsibilities and he is helped by part-time advisors. The high proportion of part-time teachers produces problems with which we also are familiar; it is difficult to arrange training courses, to introduce new methods of teaching and to improve standards of work.

The system is such that a director is free to put on whatever the public needs or asks for and to experiment with new courses and to carry them until they either establish themselves or fail. He is free to use whatever publicity is most suitable. In Zurich the director places a full-page advertisement in the principal local paper three times a year. This general announcement is followed up by leaflets of the kind used in evening institutes in this country, distributed by post and other means. Also a director is free to equip his classes as he wishes and to decide how many students there should be in each. The classes I saw had in general no more than twelve students. The accommodation was adult, the furniture designed for the purpose and the equipment considerably more polished than we should expect to find in our evening centres. Everything was in striking contrast to evening institutes in Britain. Most of our institutes use the premises and facilities of one of our

secondary schools and are staffed by part-time teachers under a part-time principal. They grew up from being the junior departments of technical colleges and under these conditions principals and teachers find it difficult to make evening institutes attractive centres of cultural life. Inevitably the premises look like a school for children, not like a club for adults.

The Zurich Driving School illustrates the kind of development which is possible in the Migros Club-Schools. The Zurich school set out to meet the steady demand for instruction in car driving. It imported from America simulating machines which enabled the early stages of driving instruction to be undertaken in the classroom. The simulators had to be adapted to Swiss road conditions and regulations and two classrooms were then equipped each with sixteen machines; classes are held all day and each evening. Some two hundred students now begin their driving instruction in this way each month. After this initial instruction they proceed on to the road with one of the seventeen driving instructors employed by the Club-School. Each instructor provides his own car and is paid an hourly rate for its use and maintenance. Similar installations are now operating in the Club-Schools of Bern and St. Gallen; and Driver Trainer Ag Zurich, an affiliated society of the Migros Federation, has obtained the European licence to market the American simulator.

The main Migros Club-School in Zurich is housed in an old mansion rented on a long lease close to the city centre. There are classes in the mornings, afternoons and evenings until 10.30 pm from Mondays to Fridays, and the director talks of opening classes on Saturdays as well, for he argues that this is the time when adults have most leisure. In the basement are rooms equipped for metalwork, jewellery and pottery classes. On the ground floor there is a coffee bar and a self-service restaurant and a large hall which is used every afternoon by a series of over-60 clubs. On other floors are specialist rooms for cookery, dress-making, art and weaving. A second club centre in the heart of the city has about forty rooms which are used mainly for language classes.

Numbers are expanding and the director has now taken the lease of a new five-storey block of offices in the centre of the city, renting the shell of the building and fitting the interior to suit the work of the institute. On the ground floor is a second driving instruction school. The main foyer is on the first floor and contains the general office, furnished and arranged in the style reminiscent of the reception centre of a good hotel. Three clerks were on duty on the night I visited and were enrolling students for classes and dealing with callers after ten o'clock at night. Adjacent is a coffee bar and a snack bar. All the classrooms were fitted with carpets, curtains and comfortable chairs were provided. Tea is served free in all the classes.

The aim throughout is to create an adult society, easy and friendly in its relationships, in which learning is a pleasure. The Migros Club-Schools have had considerable success because they have been alert to respond quickly to the students' needs. They are sensitive to what their customers want because the organisation is consumer orientated.

This is the first of a series of short articles, to be published regularly, describing some of the main educational statistics.

The Statistics of Finance

Educational expenditure by public authorities in the United Kingdom was £1,354 million in 1963-4. This was nearly three times as much as ten years earlier (£470 million) and represented an increase in education's share of the gross national product from 3 per cent to 5 per cent. Including also school meals and milk, expenditure reached £1,437 million (£512 million in 1953-4) or 5.3 per cent of the gross national product (3.4 per cent).

The 1963-4 figure of £1,354 million comprised £1,122 million of current and £232 million of capital expenditure. The totals for each country were as follows:

(£ million)

	1953-4 *Current*	*Capital*	*Total*	1963-4 *Current*	*Capital*	*Total*
England and Wales	340	66	405	969	197	1,167
Scotland	46	7	53	125	29	154
Northern Ireland	9	3	12	27	6	33
United Kingdom	395	76	470	1,122	232	1,354

Most of the expenditure was undertaken by local education authorities:

(£ million, 1963-4)

	England and Wales	*Scotland*	*N. Ireland*	*Total*
Local education authorities	1,011	123	25	1,159
Central depts. of education	62	16	5	83
University Grants Committee	94	15	3*	112
Total	1,167	154	33	1,354

*by Ministry of Finance in respect of universities.

This table does not show how the cost was divided between central and local authorities: it shows whose is the initial responsibility for payment. There was a redistribution of the costs of the service through general and specific grants in Great Britain and through special arrangements in Northern Ireland.

The Grant System

The present system for aiding local authority expenditure in England and Wales dates from the financial year 1959-60, when the previous system of a number of specific (mainly percentage) grants was replaced by a general grant, the amount of which was to be fixed in advance for a short period of years. Education was the largest of the specific

grants that were abolished and is still the biggest part of the field now covered by the general grant, amounting to nearly 85 per cent of the total.

The procedure is as follows. Each local education authority submits estimates of its expenditure for the coming two years. These are scrutinised by the Department of Education and Science in the light of known facts about the school population, the available supply of teachers, building programmes and likely developments. It is also necessary to ensure that the total of the expenditure envisaged, though bound to rise, does not do so out of all proportion to the likely increase in national resources. Discussions are held with representatives of the local authorities. The estimates are then combined with the total proposed for other blocks of local expenditure and Parliament is invited to agree to a proportion to be met by way of a general grant. The resulting sum is then divided, by agreed formulas, between the authorities.

The system does not, and is not intended to, control local expenditure from the centre. Capital programmes apart—and subject to statutory obligations and minimum standards—local authorities are free to spend as much as they choose on their education services. If they spend more on education the burden falls on the rates; if they spend less the rates can benefit. At the local level the elected county or county borough council is the ultimate authority, on advice from its education committee but also from its finance committee. The function of DES is not so much to control local authority expenditure as to secure adequate educational provision and to bring to the attention of the providing authorities needs that ought to be met. In so doing it must have regard to the state of the economy, to the other demands of the public sector, and to securing a reasonable return for money spent.

The present distribution, under the system of general grant, can be taken as 60 per cent from the Exchequer to 40 per cent from the rates. In addition the central Government spends directly: in assistance to voluntary bodies, direct-grant schools, national institutions, and educational research. This brings the proportion of total public spending on education (excluding school meals) financed by the Exchequer to about 70 per cent. The system which has operated since 1959-60 is now to be changed. The Government has decided to introduce a new system of Exchequer aid for the education service, within the context of a thoroughgoing reform of the relationship between local and central finance.

Expenditure Analysed

If the total for 1963-64 is divided according to the successive stages of the education service, secondary education was the biggest spender, followed by primary education.

(£ million, 1963-4)

	England & Wales	*United Kingdom*
Nursery	3.1	3.3
Primary	299.8	356.1
Secondary	419.1	484.0
Special	25.9	28.9
Further and adult	163.0	183.7
Training of teachers	46.1	51.5
Universities	122.3	145.2
Other	87.4	101.0
Total	1,166.8	1,354.1

Over a four-year period (from 1959-60 to 1963-4) expenditure on the different stages of education in England and Wales showed the following rates of increase:

(£ million, England and Wales)

	1959-60	1963-64	*per cent increase*
Nursery and primary	221.9	302.9	36.5
Secondary	285.0	419.1	47.1
Special	16.8	25.9	54.2
All schools	523.7	747.9	42.8
Further and adult	86.8	163.0	87.8
Training of teachers	19.2	46.1	140.1
Universities	67.9	122.3	80.2
All further and higher education	173.9	331.4	90.5
Youth service and physical training	7.6	16.3	114.5
Other	53.0	71.1	34.2
Total	758.4	1,166.8	46.2

During this period expenditure on further and higher education was rising more than twice as fast as school expenditure; and within the total for further and higher education expenditure on the training of teachers was the most rapidly expanding sector. The youth service and physical training sector also showed a rapid rate of rise.

The salaries of teachers in maintained schools and establishments went up from £153 million in 1953-4 to £430 million in 1963-4.

The figures in this article are taken from *Statistics of Education 1964*, Part I (published by HMSO), which gives the first fully detailed account of public educational finance in the United Kingdom.

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